DOCUMENT RESUME

ED 317 807 CE 054 626

AUTHOR Yuen, Steve Chi-Yin
TITLE Three Years Later: An Assessment of the Mississippi Diversified Technology Initiative. Final Report.
SPONS AGENCY University of Southern Mississippi, Hattiesburg.
PUB DATE Dec 89
NOTE 27p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Administrator Attitudes; High Schools; *Student Characteristics; *Student Recruitment; *Teacher Administrator Relationship; *Teacher Background; Technical Education; *Technological Advancement
IDENTIFIERS *Diversified Technology; Mississippi

ABSTRACT

The purpose of a study was to determine the demographics of the Diversified Technology (DT) program, its acceptance, and implementation in Mississippi. The DT program is a 2-year program to prepare 11th- and 12th-graders to go into postsecondary programs in technical areas such as hydraulics, robotics, lasers, and computer-aided design. At the time of the study there were 44 DT programs operating in Mississippi. Questionnaires were returned by 44 teachers, 42 vocational directors, 42 counselors, and 833 (88 percent) students. Findings included the following: 32 vocational centers had the 2-year program, 12 had only the first-year program; teachers reported that nearly one-third of the students who had completed the DT program had enrolled in postsecondary programs; 47 percent of the students currently enrolled expressed an interest in entering junior college technical programs upon completion of high school; most of the DT teachers came from industrial arts, science, and vocational education with an average of 6.8 years of teaching experience; 28 percent of the students were female; students cited counselors as most influential in the decision to enroll in the DT program, whereas teachers indicated that the greatest effort in recruiting students came from the teachers themselves; and vocational directors supported and promoted the DT program at their schools and provided the necessary support for the DT teachers. (Fourteen data tables are included in the report.) (CML)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED317807

FINAL REPORT

Three Years Later: An Assessment of the Mississippi Diversified Technology Initiative

by

Steve Chi-Yin Yuen, Ph.D.

Associate Professor

Department of Business and Industrial Education

The University of Southern Mississippi

Hattiesburg, Mississippi

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

December, 1989

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Steve Chi-Yin Yuen

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

The findings of the report is part of a study done through a grant from the University of Southern Mississippi.

CE054626

BEST COPY AVAILABLE

An Assessment of Diversified Technology Programs in Mississippi

With technological changes occurring in telecommunications, computer applications, and advanced manufacturing technology, production processes and service delivery systems are allowing us to achieve higher productivity, better quality, greater efficiency, and lower costs. Today, robotics, computer-aided design, lasers, programmable controllers, automation, and computer numerical control are all examples of high technology equipment that industries are currently using in Mississippi. The development of new technologies and their adoption by business and industry are reshaping and placing new demands on education in Mississippi. Diversified Technology is a new high school educational program which responds to the training demands of those areas using advanced technology.

Diversified Technology is a two-year program aimed at providing 11th and 12th graders with a technologically literate base. The purpose of the Diversified Technology program is to prepare high school students with an interest in "high-tech" careers to go into postsecondary programs and specialize in one of the technical areas such as hydraulics, robotics, lasers, computer-aided design, etc. The program is designed to meet two hours per day for five days per week for a period of two years. Initially, five pilot programs were established throughout the state. Eleven were added during the 1986-1987 school year. Today (FY 89) there are 47 Diversified Technology programs established within vocational education centers throughout Mississippi. It is expected that more programs will be added in Mississippi vocational centers during the next few years.

Purpose

The purpose of this study was to determine the demographics of the Diversified Technology program, its acceptance and implementation in Mississippi. Specific questions posed for the study were:

1. What are the Diversified Technology teachers' backgrounds and their attitudes toward the program?

2. How do vocational directors and counselors perceive Diversified Technology?

3. Do school administrators show serious commitment to the implementation of Diversified Technology?

4. What are the Diversified Technology teachers' and vocational directors' opinions regarding budget, teaching endorsement, course prerequisites, course content, course credits and offering, student recruitment, teacher training, curriculum, instructional materials, and equipment?

5. What are the strengths, the weaknesses, and the needs of the Diversified Technology program?

6. What are the students' backgrounds and their attitudes toward the Diversified Technology program?

7. How much interest do students have in learning Diversified Technology and how do they rate the Diversified Technology program at their schools?

8. Do students have difficulty in learning Diversified Technology? If so, which module(s) of the program do they have the most difficulty in learning and understanding?

9. What do students plan to do after they graduate from high school?

10. Are student attitudes toward the Diversified Technology program related to the selected variables (i.e., sex, last year's final grade in Diversified Technology, current grade in Diversified Technology, grade point average, year of program enrollment, student organization participation, plans after high school graduation, interest in the program, satisfaction with the program, program recommendation, degree of difficulty in learning)?

Methodology

Population

At the time of this study, there were 44 Diversified Technology programs in operation within Mississippi in FY 89. The population for the study consisted of 44 vocational directors, 44 Diversified Technology teachers, 44 counselors, and 949

Diversified Technology students in vocational centers that offered the Diversified Technology program.

Instrumentation

Data were collected using four sets of questionnaires designed by the researcher. The teacher questionnaire consisted of 47 questions and statements and was constructed in two parts. The first part was designed to provide a demographic profile of the Diversified Technology teachers. The second part was designed to gather information about teachers' attitudes toward the Diversified Technology program and their opinions regarding a number of topics that included course prerequisites, course content, instructional materials, curriculum, teacher training, teaching endorsement, student recruitment, budget, equipment, program needs, strengths and weaknesses of the Diversified Technology program.

The director questionnaire consisted of 21 questions and statements and was designed to gather information about the vocational directors' backgrounds, their attitudes toward the Diversified Technology program, and their opinions regarding course prerequisites, course content, teacher training, teaching endorsement, student recruitment, and program strengths and weaknesses.

The counselor questionnaire consisted of 14 questions and statements and was designed to gather information about the counselors' backgrounds, their efforts in recruiting students for the Diversified Technology program, and their attitudes toward the Diversified Technology program.

The student questionnaire consisted of 17 questions and statements and was designed to gather information about students' backgrounds, courses taken, plans after high school graduation, interests in the program, satisfaction with the program, program recommendation, degree of difficulty in learning, and their attitudes toward the Diversified Technology program.

Before the questionnaires were applied to the subjects, a pilot study was conducted to evaluate and validate the questions. The questionnaires were reviewed by a jury of experts to assess content validity and usability. Suggested revisions

were made following this review. The result of the pilot study indicated that the reliability of the attitudes scale of the instrument using Cronbach's alpha was 0.92.

Data Collection

Data for the study were collected during the Spring of 1989. Vocational directors in the 44 secondary vocational centers were contacted, and they agreed to participate in the study. The questionnaires, along with a cover letter, were mailed to the vocational director, counselor, and Diversified Technology teacher in each vocational center. Teachers in the study were asked to serve as distributors of the questionnaires to the students. Completed student questionnaires were returned in postage paid envelopes by the teachers to the researcher. Three weeks after the questionnaires were mailed, a follow-up letter with a second stamped survey was mailed to each nonrespondent. As the results, 44 (100%) teachers, 42 (95.5%) directors, 42 (95.5%) counselors and 833 (87.8 %) students completed and returned the questionnaires.

Data Analysis

Descriptive statistical procedures including frequencies, percentages, means, and standard deviations were used to analyze the data. Factor analysis and stepwise multiple regression analysis were used to established relationships between students' attitudes toward the Diversified Technology program and the selected variables that might explain any differences in attitudes.

Findings

Forty-four vocational centers offered the Diversified Technology program in Mississippi. Of these, 32 vocational centers had the first and second year programs and 12 vocational centers had only the first year program. There were 767 students enrolled in the first year program and 182 students enrolled in the second year program. Teachers reported that nearly one-third of the students (32%) who had completed the Diversified Technology program had enrolled in post-secondary programs and 47% of the students currently enrolled in the Diversified Technology program have expressed an interest in entering junior college technical programs upon completion of high school.

Teacher Backgrounds

Since there is no teacher training program that specifically prepares Diversified Technology teachers, teachers who have a license to teach in one or more areas such as industrial arts, science, physics, or math, or have T & I certification in electronics can become Diversified Technology teachers upon completion of a one-week staff development course in Diversified Technology. The results revealed that most of the Diversified Technology teachers came from the backgrounds of industrial arts, science, and vocational education with an average 6.8 years of teaching experience. The complete background information about Diversified Technology teachers is presented in Table 1.

Attitudes Toward the Diversified Technology Program

To assess the attitudes of teachers, directors, and counselors toward the Diversified Technology program, each was asked to indicate their degree of agreement with each of the 13 items using a five point Likert-type scale ranging from 1 to 5 with 1 indicating Strongly Disagree to 5 indicating Strongly Agree. Table 2 presents the mean rating, the standard deviation, and the rank for each item. The items rated highest by teachers, directors, and counselors were statements 1, 2, and 4. However, they gave the lowest ratings to the statements 12 and 13.

Perception and Awareness of the Diversified Technology Program

Teachers reported that their administrators (88.6%), counselors (77.3%), and other teachers (65.9%) were positive about the Diversified Technology program at their schools. Diversified Technology teachers felt that the majority of administrators (77.3%), counselors (75%), other teachers (50%), and students (59.1%) were either fairly well or very well informed about the Diversified Technology program at their respective schools. However, a total of 54% of all teachers, directors, and counselors felt that the general public was not aware of the Diversified Technology program at their particular school.

Administrative Support

Most teachers (80%) indicated that the central administration at their schools had supported and promoted the Diversified Technology program. Furthermore,

vocational directors reported that the central administration had provided the following support for their teachers: (a) adequate budget (95.2%), (b) laboratory space (90.5%), (c) inservice training (85.7%), (d) instructor preparation time (78.6%), (e) equipment fund (76.2%), and (f) support staff (73.8%).

Almost all directors agreed that they had provided adequate budget for Diversified Technology teachers. However, teachers reported that the average operating budget for a Diversified Technology program each academic year was $1,082.93 and the average budget for a program should be $1,745.92 each academic year.

Teaching Endorsement in Diversified Technology

Teachers and vocational directors were asked whether they were in favor of having a separate teaching endorsement or certificate for teaching Diversified Technology. The results show that 47.7% of the teachers and 45.2% of the directors were in favor of separate certification, while 29.5% of the teachers and 16.7% of the directors were undecided. Table 3 shows the suggested course requirements for becoming a Diversified Technology teacher as reported by directors and teachers.

Course Prerequisites

Table 4 shows the courses that a high school student should have before enrolling in the Diversified Technology program. The majority of teachers and directors indicated that Algebra I should be the required course before taking Diversified Technology. In addition, they indicated that it was desirable for students to have algebra II, geometry, physics, and typing before enrolling in Diversified Technology.

Course Content

The teachers and directors were asked to identify the field of technology that should be added to the current Diversified Technology program. Teacher recommendations were tele-communications (90.9%), followed by optical systems (57.1%), instrumental and control (54.4%), and computers (45%). Similarly, the directors recommended tele-communications (78.6%) should be added to the

program, followed by optical systems (45.2%), instrumental and control (40.5%), and computers (31%).

Course Credits and Offering

In questioning whether applied physics credits should be given to the students who completed the Diversified Technology program, the results revealed that teachers (84.1%), directors (95.1%), and counselors (95.1%) were overwhelmingly in favor of granting applied physics credit for Diversified Technology students. The majority of teachers (65.9%), directors (76.2%), and counselors (78.6%) indicated that they would like to expand the Diversified Technology program and offer it to adults.

Student Recruitment

Eighty percent of the teachers reported that counselors assisted in recruiting students for the Diversified Technology program at their schools. However, Diversified Technology teachers indicated that the greatest effort in recruiting students for the Diversified Technology program came from teachers themselves (46.5%), followed by counselors (27.9%), students (20.9%), and vocational directors (4.7%).

Teacher Training

Of the 44 teachers, only one had not received a one-week staff-development course in Diversified Technology. The staff-development course is normally required for a new Diversified Technology teacher and is conducted by the Mississippi State Department of Education each summer. Forty-three percent of the teachers said they were well satisfied with the quality of training received in the staff-development course and 50% said they were more satisfied than dissatisfied.

Eighty-eight percent of the teachers reported that they were either comfortable or very comfortable with teaching Diversified Technology. Almost all teachers (97.7%) indicated that they had benefited from teaching Diversified Technology classes and 95.5% of the teachers said that they would volunteer to teach Diversified Technology if they had it to do over. In addition, 89.6% of the

teachers expressed an interest in taking additional courses or workshops for teaching Diversified Technology.

Curriculum, Instructional Materials, and Equipment

Ninety-five percent of the teachers agreed that Diversified Technology curriculum challenged or matched student ability and 82% of the teachers were in favor of standardized activity workbooks. To shed some light on the question of satisfaction, teachers were asked if they were satisfied with the quality of available equipment, available instructional materials, and the current curriculum. The results indicated that the majority of teachers were satisfied with the quality of available equipment (86.4%), available instructional materials (65.9%), and the curriculum (72.7%).

Strengths, Weaknesses, and Needs of the Diversified Technology Program

Table 5 presents the eight specific factors from which the directors and teachers identified the greatest strengths of their programs. Staffing was selected by the directors as an area of greatest strength in the Diversified Technology program at their schools. The second most often cited strength by the directors was course content. Course content was the greatest strength and administrative support was the second most often cited strength in the Diversified Technology program as reported by the teachers.

Table 6 presents the nine specific factors from which the directors and teachers identified the greatest weakness of their programs. Enrollment was the area most often cited as a major weakness by teachers (47.6%) and directors (50%).

As illustrated in Table 7, the largest percentage of teachers (40.5%) said their greatest need in the Diversified Technology program was for laboratory materials. Others reported that their area of greatest need was for student enrollment (21.4%) or for instructional materials (19%).

Student Backgrounds

Table 8 shows students' backgrounds. Since the data were collected before the end of the Spring term, the current grade standing in Diversified Technology in

Table 8 was the grade standing reported approximately three weeks before the final examination.

Students were asked to identify individual(s) who had helped them decide to enroll in the Diversified Technology program. Their responses are summarized in Table 9. Counselors (37.3%) were the most often cited group as having influenced the students' decisions to enroll in the Diversified Technology program.

Difficulty and Interest in Learning Diversified Technology

Sixty percent of the students reported that they had some difficulty in learning Diversified Technology and 24% stated that learning was very difficult. However, 79.6% of the students said they had either considerable interest or great interest in learning Diversified Technology.

In order to evaluate each module in the program, students were asked to identify the module that was the most difficult to learn and understand. The responses are summarized in Table 10. The top three most difficult modules reported by the students were modules 9, 10, and 12.

Students were asked to report the courses that they completed before taking Diversified Technology and to indicate whether the courses helped them in Diversified Technology or not. Furthermore, they were asked to list the courses that they were taking along with Diversified Technology and the courses that they plan to take next year. Their responses to these questions are shown in Table 11.

Overall, 44.7% of students rated the Diversified Technology program at their schools excellent, followed by good (43.3%), fair (10%), unsatisfactory (1.1%), and poor (1%). They held strong opinions about the Diversified Technology program and 93% of the students said they would recommend the program to other students. Table 12 shows students' plans after graduation from high schools.

Students' Attitudes Toward the Diversified Technology Program

To assess student attitudes, respondents were asked to indicate their degree of agreement with each of 15 items using a five point Likert-type scale ranging from 1 to 5 with 1 indicating Strongly Disagree to 5 indicating Strongly Agree. Table 13 presents the mean rating, the standard deviation, and the rank for each item. The

item rated the highest by students was "Diversified Technology teaches me skills useful in technical careers," followed by "Diversified Technology provides me with a foundation for pursuing a challenging career in high technology," and "Diversified Technology classes are good for me." The items with which students least agreed were "Diversified Technology teaches me skills in quality control and inventory control" and "Diversified Technology teaches me skills in entrepreneurship."

Relationships Between Students' Attitudes and Selected Variables

In order to determine whether student attitudes toward the Diversified Technology program were related to the selected variables, each of the 15 items was examined by factor analysis using the principal components method and varimax rotation. Two factors were identified and labeled: (a) technical content, and (b) worklife skills. For the first factor, technical content, 11 questionnaire items loaded .55 or higher: Item 1 (.76), item 2 (.77), item 3 (.60), item 4 (.57), item 5 (.69), item 7 (.62), item 8 (.70), item 9 (.66), item 10 (.56), item 14 (.61), and item 15 (.57). For the second factor, 4 questionnaire items loaded .55 or higher: Item 6 (.67), item 11 (.65), item 12 (.82), and item 13 (.81).

To determine whether the independent variables (i.e., sex, year of program enrollment, last year's final grade in Diversified Technology, current grade in Diversified Technology, grade point average, student organization participation, plans after high school graduation, interest in the program, satisfaction with the program, program recommendation, and degree of difficulty in learning) were related to the attitude factors, a step-wise multiple regression analysis was conducted. The two factors identified by factor analysis were used as dependent variables. The order of entry into the regression equation was determined by the maximization of $\underline{F}$ and R^2. A probability level of .05 was used to determine if each independent variable significantly contributed to the explanation of variance in each factor. The results of the stepwise multiple regression analyses are shown in Table 14.

For the first factor, technical content, seven variables contributed to the variance. These variables in order of entry were: (a) satisfaction with the program, (b) program recommendation, (c) interest in the program, (d) year of program

enrollment, (e) current grade in Diversified Technology, (f) sex, and (g) last year's final grade in Diversified Technology. These variables accounted for 60.1% of the variance (R^2) in this factor.

For the second factor, worklife skills, two variables significantly explained the variance. These variables in order of entry were: (a) interest in the program, and (b) program recommendation. However, these variables only explained 20.8% of the variance (R^2) in this factor.

Conclusions and Recommendations

The findings of this study indicated that school administrators showed serious commitment to the implementation of Diversified Technology. Vocational directors supported and promoted the Diversified Technology program at their schools and they provided the necessary support for the Diversified Technology teachers.

Counselors gave a high rating to the Diversified Technology program. They were fairly well informed about the Diversified Technology program at their schools and they actively advised and recruited students for the program.

There is no teacher education program for training Diversified Technology teachers, however, most of these teachers came from the backgrounds of industrial arts, science, math, and vocational education with an average 6.8 years of teaching experience. Most Diversified Technology teachers had some work experiences (including military service but excluding teaching) that were related to the Diversified Technology subject matter.

Most teachers were satisfied with the Diversified Technology teacher training workshops and they found themselves comfortable with teaching Diversified Technology. Teachers displayed positive attitudes toward the Diversified Technology program and they expressed an interest in taking additional courses or workshops to update themselves in different content areas of Diversified Technology.

Teachers and directors perceived course content to be the greatest strength of the Diversified Technology program. Enrollment was seen as the greatest weakness of the program.

The majority of students in the Diversified Technology program were male and enrolled in the first year program. Most had above average academic standing. Most of the students were interested in learning Diversified Technology. However, they had relatively more self-reported difficulty with learning Diversified Technology in the areas of mechanical systems, electrical systems, lasers, fluid systems, and thermal systems. This may be due to the fact that the majority of the students had not completed a course in physics.

Students displayed positive attitudes about their experiences in the Diversified Technology program. Student interest, satisfaction with the program, program recommendation, sex, level of the program enrolled, the current grade and last year's final grade in Diversified Technology significantly contributed to the explanation of variance in students attitudes about the technical content of the program.

Students were satisfied with the Diversified Technology program at their schools and they gave a high rating to their school's program. More than 9 out of ten of the students would recommend the Diversified Technology program to other students and more than half planned to attend a two- or four-year college after high school graduation. These responses are indication that students are pleased with the program and that they seek further training to prepare themselves in technical careers.

Overall, the Diversified Technology program has made a good start in Mississippi. Most teachers, directors, and counselors are enthusiastic about the Diversified Technology program and there is general support for the program. However, based on the findings of this study and the suggestions from the participating teachers, directors, counselors, and students, the following recommendations are offered in order to ensure the success of the Diversified Technology program in Mississippi:

1. A statewide public campaign should be launched to publicize the Diversified Technology program so that parents, students, and the general public are more informed about the Diversified Technology program.

2. A concerted effort should be made to recruit more qualified students into the program.

3. The State Department of Education and teacher education institutions should work together to develop a teacher training model for preparing qualified Diversified Technology teachers.

4. Workshops or inservice training programs should be developed to update teachers' knowledge in different content areas of Diversified Technology.

5. The State Department of Education, universities, Research and Curriculum Unit (R/CU), and Diversified Technology teachers should work together to continually update the curriculum, lab activity materials and instructional materials. Organized learning materials such as textbooks and standardized activity workbooks should be developed to assist students in learning Diversified Technology. Furthermore, the State Department of Education, universities and R/CU should support information dissemination and provide expertise and resources to Diversified Technology teachers.

6. The State Department of Education should provide funding for research to monitor, and evaluate the quality of the Diversified Technology program. In addition, program evaluation procedures and standards for the Diversified Technology program should be developed.

7. Curriculum should be continually updated and organized. Learning materials such as textbooks and standardized activity workbooks should be developed to assist students in learning Diversified Technology.

8. Further research should be conducted to analyze the curriculum to determine necessary program prerequisites.

9. A follow-up study of Diversified Technology students should be conducted every three to five years to assess the outcomes of the Diversified Technology program.

Table 1

Diversified Technology Teachers Profile

Variable	n	%
Sex		
Female	4	9.1
Male	40	90.9
Age		
Under 30	9	20.5
30-39 years	16	36.4
40-49 years	11	25.0
over 49 years	8	18.2
Educational level		
Associate's degree	1	2.3
Bachelor's degree	18	41.9
Master's degree	18	41.9
Beyond master's degree	6	11.6
Other	1	2.3
Teaching certificate		
Emergency	1	2.3
A	28	65.1
AA	10	23.3
AAA	4	9.3
Teaching endorsement*		
Industrial arts	15	37.5
Science	14	35.0
Vocational education	12	30.0
Math	8	20.0
Administration	6	15.0
Computer science	5	12.5
Social Studies	1	2.5
Teaching experience prior to becoming a Diversified Technology teacher*		
Math	15	37.5
Physics	5	12.5
Physical science	9	22.5
Industrial arts	17	42.5
Vocational areas	10	25.0
Other	23	57.5
Working experience related to Diversified Technology subject matter		
0 year	11	26.2
1-4 years	6	14.3
5-9 years	11	26.2
10-14 years	5	11.9
15-19 years	3	7.1
20 or more years	6	30.0
Area of occupational and teaching experience*		
Technology and systems	19	44.2
Electrical systems	32	74.4
Mechanical systems	28	65.1
Fluid systems	22	51.2
Thermal systems	15	34.9
Worklife skills	19	43.2
None of above	7	16.3
Course taken in college*		
Math	38	88.4
Physics	26	60.5
Computer science	22	50.0
Electronics	23	52.3
Industrial arts	22	50.0
Engineering	8	18.6

*Percentages add up to more than 100% due to multiple responses.

Table 2

Attitudes Toward the Diversified Technology (DT) Program

Item	M	SD	Rank
1. DT teaches students skills useful in technical careers.	4.55	0.76	2 (A)
	4.57	0.77	1 (B)
	4.67	0.61	2 (C)
2. DT provides students with a foundation for pursuing a challenging career in high technology.	4.77	0.47	1 (A)
	4.49	0.94	2 (B)
	4.68	0.61	1 (C)
3. DT helps students adapt themselves to the workforce and its changing demands.	4.33	0.68	8 (A)
	4.17	0.91	7 (B)
	4.41	0.63	9 (C)
4. DT addresses the needs of the technical workforce and prepares students to seek further training in a junior college.	4.52	0.66	3 (A)
	4.38	0.88	4 (B)
	4.64	0.49	3 (C)
5. DT helps students understand how to enter and advance in technology related occupations.	4.41	0.73	6 (A)
	4.15	0.95	8 (B)
	4.45	0.63	7 (C)
6. DT helps students develop leadership and management skills.	4.02	0.70	11 (A)
	3.88	1.04	12 (B)
	4.14	0.73	11 (C)
7. DT helps students learn the issues, dimensions, and uses of technology in society.	4.23	0.77	9 (A)
	4.14	0.90	9 (B)
	4.43	0.63	8 (C)
8. DT helps students learn the components of a technical system and how to solve problems within systems.	4.43	0.59	5 (A)
	4.31	0.98	5 (B)
	4.60	0.59	4 (C)
9. DT teaches students how advanced technology works and how to solve related technical problems.	4.34	0.61	7 (A)
	4.26	0.86	6 (B)
	4.50	0.55	6 (C)
10. DT helps students learn the underlying principles at work in technical systems.	4.50	0.55	4 (A)
	4.48	0.92	3 (B)
	4.59	0.55	5 (C)
11. DT helps students learn skills in participation and communication.	4.11	0.81	10 (A)
	4.02	0.81	10 (B)
	4.19	0.63	10 (C)
12. DT teaches students skills in quality control and inventory control.	3.86	0.70	12 (A)
	4.00	0.83	11 (B)
	4.00	0.80	12 (C)
13. DT teaches students skills in entrepreneurship.	3.75	0.78	13 (A)
	3.86	0.95	13 (B)
	3.83	0.79	13 (C)

Note. (A)=Teachers; (B)=Directors; (C)=Counselors.

Table 3

Course Requirements for Becoming a Diversified Technology Teacher as Suggested by Teachers and Directors

	Teacher (n=41)			Director (n=39)		
Course	Number	%	Ave Credits	Number	%	Ave Credits
Science	36	87.8	14.2	32	82.1	10.4
Mathematics	38	92.7	13.2	36	92.3	10.5
Technology	32	78.0	12.9	33	84.6	14.5
Vocational Education	24	58.5	14.3	31	79.5	18.2
Other	10	24.4	13.6	0	0.0	0.0

Table 4

Prerequisites for Enrollment in Diversified Technology as Recommended by Teachers and Directors

Course	Teacher				Director			
	Desirable		Required		Desirable		Required	
	n	%	n	%	n	%	n	%
General Math	9	20.5	21	47.7	9	21.4	19	45.2
Pre-Algebra	9	20.5	11	25.0	11	26.2	9	21.4
Algebra I	2	4.5	42	95.5	7	16.7	34	81.0
Algebra II	26	59.1	2	4.5	22	52.4	3	7.1
Geometry	29	65.9	5	11.4	27	64.3	4	9.5
Trigonometry	25	56.8	1	2.3	15	35.7	1	2.4
Physical Science	17	38.6	16	36.4	16	38.1	15	35.7
Physics	30	68.2	1	2.3	20	47.6	1	2.4
Basic Vocational Education	10	22.7	3	6.8	19	45.2	4	9.5
Industrial Arts	13	29.5	4	9.1	21	50.0	3	7.1
Chemistry	21	47.7	1	2.3	14	33.3	1	2.4
Typing	30	68.2	7	15.9	23	54.8	6	14.3
English Composition	17	38.6	15	34.1	9	21.4	15	35.7

Table 5

Greatest Strengths of the Diversified Technology Program as Reported by Teachers and Directors

	Teacher		Director	
Greatest Strengths	n	%	n	%
Administrative support	10	23.3	8	19.5
Course content	14	32.6	10	24.4
Enrollment	1	2.3	1	2.4
Facility	6	14.0	1	2.4
Funding	2	4.7	0	0.0
Methodology	3	7.0	2	4.9
Resources	3	7.0	3	7.3
Staffing	4	9.3	16	39.0

Table 6

Greatest Weaknesses of the Diversified Technology Program as Reported by Teachers and Directors

	Teacher		Director	
Greatest Weaknesses	n	%	n	%
Administrative support	2	4.8	1	2.4
Course content	5	11.9	5	11.9
Enrollment	20	47.6	21	50.0
Facility	1	2.4	1	2.4
Funding	5	11.9	1	2.4
Methodology	2	4.8	3	7.1
Resources	6	14.3	4	9.5
Staffing	1	2.4	2	4.8
Other	0	0.0	4	9.5

Table 7

Areas of Greatest Need in the Diversified Technology Program

	Teachers reporting	
Area of need	n	%
Lab activities materials	17	40.5
Student enrollment	9	21.4
Instructional materials	8	19.0
Equipment	4	9.5
Administrative support	2	4.8
Other	2	4.8
Faculty support	0	0.0
Personal knowledge	0	0.0

Table 8

Diversified Technology (DT) Students Profile

Variable	Number	Percent
Sex		
Female	230	27.6
Male	602	72.4
Age		
15 years	8	0.9
16 years	172	20.7
17 years	409	49.2
18 years	215	25.8
19 years	28	3.4
Last year's final grade in DT		
A	46	31.1
B	85	57.4
C	14	9.5
D	1	0.7
F	2	1.4
Current grade standing in DT		
A	259	31.5
B	405	49.2
C	140	17.0
D	12	1.5
F	7	0.9
Grade point average		
A	87	10.5
B	407	49.2
C	311	37.6
D	20	2.4
F	2	0.2
AIASA/TSA membership		
Yes	362	43.6
No	468	56.4

Table 9

Persons Influencing Students' Decisions to Enroll in the Diversified Technology Program

Source	Number	Percent
Parents	148	17.8
Teachers	172	20.7
School administrators	62	7.5
Counselors	310	37.3
Friends	244	29.4
No one (I just took it)	280	33.7
Other	43	5.2

Note. Percentages are based on the total number of respondents (N=830). Percentages total more than 100% because respondents were allowed more than 1 response.

Table 10

Percentages of Students Reporting the Most Difficult Module in the Diversified Technology Program

Module		Year One (N=678)		Year Two (N=141)	
		N	%	N	%
1.	Course overview	1	0.1	0	0.0
2.	Introduction to technology	2	0.3	1	0.7
3.	Introduction to systems	1	0.1	4	2.8
4.	Microcomputer fundamentals	3	0.4	4	2.8
5.	Introduction to robotics	25	3.7	12	8.5
6.	Computer numerical control fundamentals	29	4.3	12	8.5
7.	Programmable controller applications	36	5.3	16	11.3
8.	Computer aided design fundamentals	13	1.9	4	2.8
9.	Introduction to lasers	127	18.7	13	9.2
10.	Understanding mechanical systems	206	30.4	14	9.9
11.	Understanding fluid systems	73	10.8	16	11.3
12.	Understanding electrical systems	149	22.0	9	6.4
13.	Understanding thermal systems	76	11.2	10	7.1
14.	Effective leadership	7	1.0	0	0.0
15.	Managing time and resources	4	0.6	0	0.0
16.	Quality control and work groups	1	0.1	0	0.0
17.	Inventory control methods	1	0.1	0	0.0
18.	Effective technical communications	7	1.0	1	0.7
19.	Running your own business	1	0.1	0	0.0
20.	Course review	1	0.1	0	0.0

Table 11

Percentage of Students Reporting the Courses Taken or Plan to Take Next Year

Course	Took this before DT	Taking this along with DT	Plan to take this next year	This helped me in the DT
General math	53.5	2.2	0.8	11.9
Pre-algebra	42.3	0.5	0.2	10.8
Algebra I	92.0	3.3	1.8	40.4
Algebra II	41.4	27.0	9.5	31.1
Geometry	64.6	12.4	5.3	26.7
Trigonometry	8.9	13.5	13.4	9.6
Physical science	58.9	1.8	2.0	14.0
Physics	4.9	11.7	18.4	10.7
Industrial arts	35.7	0.8	1.1	7.5
Typing	66.3	6.0	5.2	33.4
Vocational Education	22.0	4.2	5.2	5.1

Note. DT=Diversified Technology.

Table 12

Plans After High School Graduation

Plan	Number	Percent
Attend a junior college technical program	210	25.2
Attend a 4-year college	393	47.2
Join the military	100	12.0
Get a job	34	4.1
Don't know	59	7.1
Other	36	4.3

Table 13

Student Attitudes Toward the Diversified Technology (DT) Program

Item		Mean	S.D.	Rank
1.	DT teaches me skills useful in technical careers.	4.33	0.74	1
2.	DT provides me with a foundation for pursuing a challenging career in high technology.	4.22	0.85	2
3.	DT helps me adapt myself to the workforce and its changing demands.	3.89	0.91	12
4.	DT addresses the needs of the technical workforce and prepares me to seek further training in a junior college.	3.90	0.97	11
5.	DT helps me understand how to enter and advance in technology related occupations.	4.07	0.84	7
6.	DT helps me develop leadership and management skills.	3.86	0.93	13
7.	DT helps me learn the issues, dimensions, and uses of technology in society.	4.09	0.80	5
8.	DT helps me learn the components of a technical system and how to solve problems within systems.	4.16	0.78	4
9.	DT teaches me how advanced technology works and how to solve related technical problems.	4.08	0.81	6
10.	DT helps me learn the underlying principles at work in technical systems.	4.06	0.78	8
11.	DT helps me learn skills in participation and communication.	3.96	0.87	10
12.	DT teaches me skills in quality control and inventory control.	3.79	0.89	14
13.	DT teaches me skills in entreprenеurship.	3.70	0.94	15
14.	DT classes are good for me.	4.21	0.88	3
15.	If I had to do it over, I would re-enroll in DT program.	4.05	1.19	9

Table 14

Regression Coefficients (Beta Weights) for Selected Variables as Predictors of Students' Attitudes[a]

Predictor Variables	Factor1	Factor2
Satisfaction with the program	.33* (1)	
Program recommendation	-.28* (2)	-.28* (2)
Interest in the program	.28* (3)	.30* (1)
Year of program enrollment	.15* (4)	
Current grade in Diversified Technology	.21* (5)	
Sex	.12* (6)	
Last year's final grade in Diversified Technology	-.13* (7)	
R Square	.60	.23
F	29.21*	20.77*

*$p < .01$

[a]Numbers in parentheses indicate the order of entry into the regression equation.